

Recent Books by IBM Authors

Book abstracts

Theory and Practice of Error Control Codes, R. E. Blahut (FSD Owego, NY). Addison-Wesley Publishing Co., Reading, MA, 1983.

The engineering problem treated by the subject of error control codes is that of protecting digital data against the errors that occur during transmission through a communication channel or during storage in computer memory. The need for error control arises from the very large volume of information now communicated or stored, much of which is very sensitive to error. A mature theory of good codes and good coding algorithms is available to meet this need. In addition, rapid advances in digital integrated circuitry have made possible the practical implementation of these algorithms.

This book is a self-contained introduction to the subject intended for both engineers and mathematicians. Both block codes and convolutional codes are treated, with emphasis on the design of many types

of decoders. The book is written from the point of view of digital signal processing by expressing the traditional ideas of error control codes in the language of digital signal processing. Introductory chapters include rigorous development of all the necessary mathematics.

Computer Design, G. G. Langdon, Jr. (RES San Jose, CA). Compu-teach Press, Inc., San Jose, CA, 1982.

This book is about the design of nontrivial digital systems, using a building-block, register-transfer-level approach. A knowledge of basic logic design is assumed, but the appendices review all of the fundamentals needed for the main part of the book. The approach reflects the hierarchical nature of computers, and attacks separately the problems of data-flow design, control-unit design, and system timing. A sixteen-bit processor is used as a design example and is implemented with two data-flow approaches (custom and bit-slice) and three control units (hardwired, microprogrammed custom data flow, and microprogrammed bit-slice). The same systematic design approach is used to design a memory system, a cache, and a dynamic-address-translation unit. The design philosophy, based on the author's IBM experience, represents a very realistic and practical approach to digital design at the register-transfer level. Considerable detail is provided and the reader is not left wondering why certain design tradeoffs are made.